
HANMENG ZHAN, University of Waterloo

Discrete-Time Quantum Walks and Graph Embeddings

A discrete-time quantum walk is determined by a unitary matrix U that acts on the arcs of a graph. For most of the existing models, the matrix U is a product of two involutions, in which case the spectrum of the walk is under control. We construct a new walk that fits in the same framework, from an orientable embedding of a graph. On one hand, this walk is closely connected to the coined walk that has been extensively studied; on the other hand, it enjoys some properties that other models do not exhibit. We will look at interesting walks from special embeddings, and prove some results through spectral analysis.